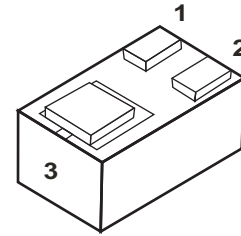


## TK3906LED03-HF (PNP)

RoHS Device  
Halogen Free



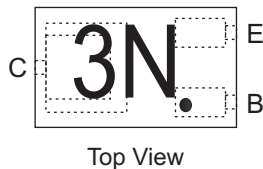
### Features

- Ultra small SMD plastic package
- Epitaxial planar die construction
- Available in lead free version

### Mechanical data

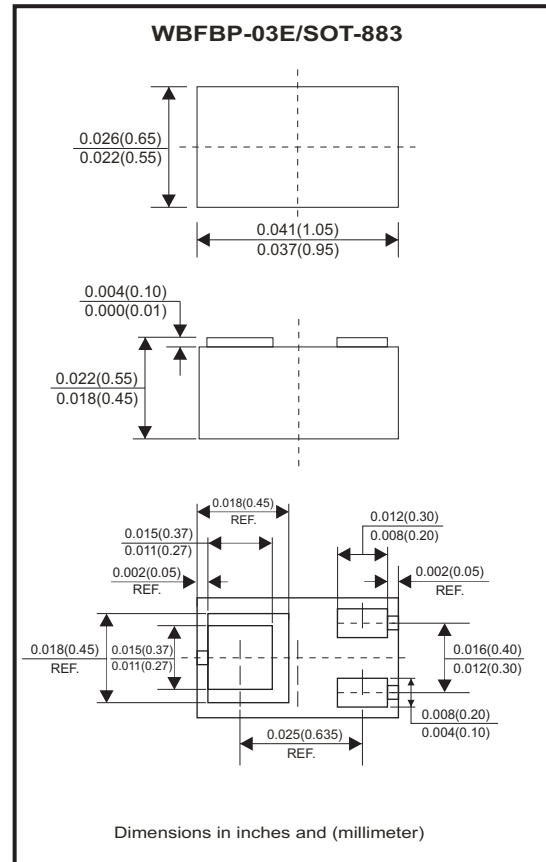
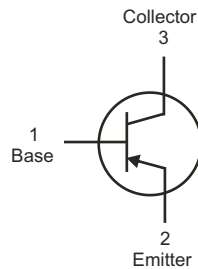
- Case: WBFBP-03E/SOT-883 molded plastic encapsulate diodes.
- Mounting position: Any.

### Marking: 3N



### Circuit Diagram

- 1. BASE
- 2. EMITTER
- 3. COLLECTOR



### Maximum Ratings (at TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base voltage	V <sub>CB0</sub>	-40	V
Collector-Emitter voltage	V <sub>CE0</sub>	-40	V
Emitter-Base voltage	V <sub>EB0</sub>	-5	V
Collector current	I <sub>c</sub>	-200	mA
Collector power dissipation	P <sub>c</sub>	100	mW
Thermal resistance from junction to ambient	R <sub>θJA</sub>	1250	°C/W
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-55~150	°C

## Electrical Characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Characteristics	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector-Base breakdown voltage	$I_C = -10\mu\text{A}$ , $I_E = 0$	$V_{(BR)CBO}$	-40			V
Collector-Emitter breakdown voltage	$I_C = -1\text{mA}$ , $I_B = 0$	$V_{(BR)CEO}$	-40			V
Emitter-Base breakdown voltage	$I_E = -10\mu\text{A}$ , $I_C = 0$	$V_{(BR)EBO}$	-5			V
Collector cut-off current	$V_{CE} = -30\text{V}$ , $V_{BE(off)} = -3\text{V}$	$I_{CEX}$			-50	nA
Emitter cut-off current	$V_{EB} = -5\text{V}$ , $I_C = 0$	$I_{EBO}$			-100	nA
DC current gain	$V_{CE} = -1\text{V}$ , $I_C = -0.1\text{mA}$	$h_{FE(1)}$	60			
	$V_{CE} = -1\text{V}$ , $I_C = -1\text{mA}$	$h_{FE(2)}$	80			
	$V_{CE} = -1\text{V}$ , $I_C = -10\text{mA}$	$h_{FE(3)}$	100		300	
	$V_{CE} = -1\text{V}$ , $I_C = -50\text{mA}$	$h_{FE(4)}$	60			
	$V_{CE} = -1\text{V}$ , $I_C = -100\text{mA}$	$h_{FE(5)}$	30			
Collector-Emitter saturation voltage	$I_C = -10\text{mA}$ , $I_B = -1\text{mA}$	$V_{CE(sat)1}$			-0.25	V
	$I_C = -50\text{mA}$ , $I_B = -5\text{mA}$	$V_{CE(sat)2}$			-0.40	V
Base-Emitter saturation voltage	$I_C = -10\text{mA}$ , $I_B = -1\text{mA}$	$V_{BE(sat)1}$	-0.65		-0.85	V
	$I_C = -50\text{mA}$ , $I_B = -5\text{mA}$	$V_{BE(sat)2}$			-0.95	V
Transition frequency	$V_{CE} = -20\text{V}$ , $I_C = -10\text{mA}$ , $f = 100\text{MHz}$	$f_T$	250			MHZ
Collector output capacitance	$V_{CB} = -5\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$	$C_{ob}$			4.5	pF
Base input capacitance	$V_{EB} = -0.5\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$	$C_{ib}$			10	pF
Noise figure	$V_{CE} = -5\text{V}$ , $I_E = -0.1\text{mA}$ , $f = 1\text{kHz}$ $R_G = 1\text{k}\Omega$	NF			4	dB
Delay Time	$V_{CC} = -3\text{V}$ , $V_{BE(OFF)} = -0.5\text{V}$	$t_d$			35	nS
Rise Time	$I_C = -10\text{mA}$ , $I_{B1} = -1\text{mA}$	$t_r$			35	nS
Storage Time	$V_{CC} = -3\text{V}$ , $I_C = -10\text{mA}$ ,	$t_s$			225	nS
Fall Time	$I_{B1} = I_{B2} = -1\text{mA}$	$t_f$			75	nS

## Rating And Characteristic Curves (TK3906LED03-HF)

Fig.1 - Static Characteristic

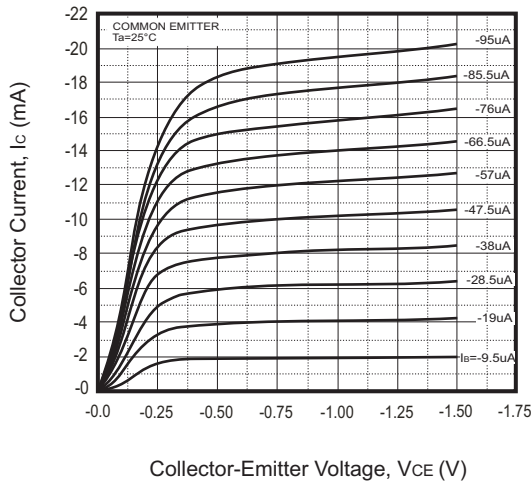


Fig.2 -  $h_{FE} - I_c$

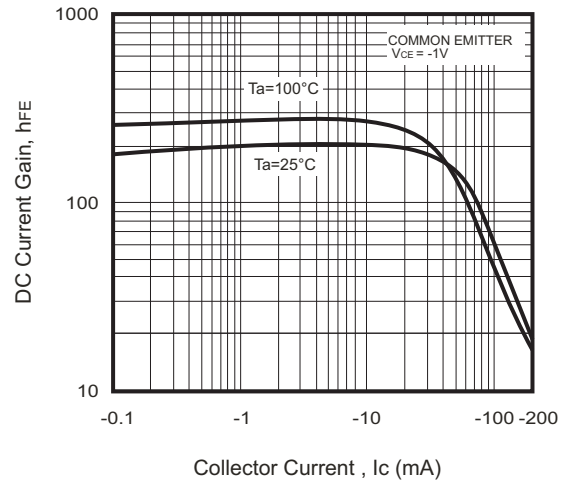


Fig.4 -  $V_{CEsat} - I_c$

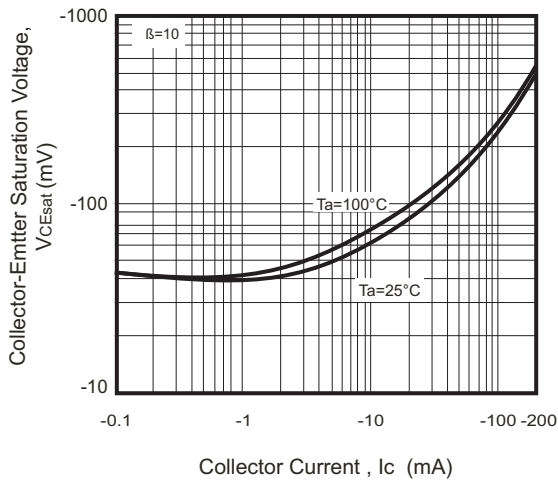


Fig.3 -  $V_{BEsat} - I_c$

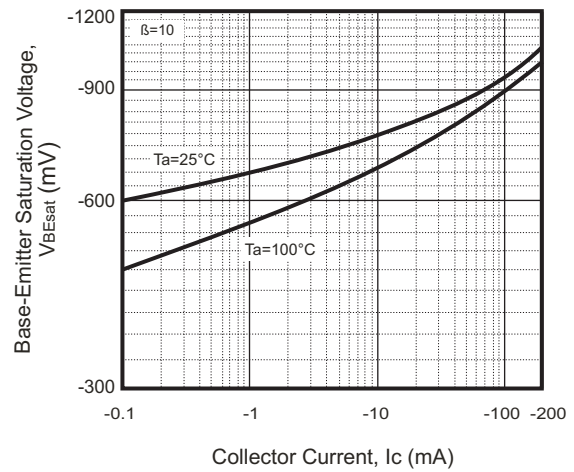


Fig.5 -  $I_c - V_{BE}$

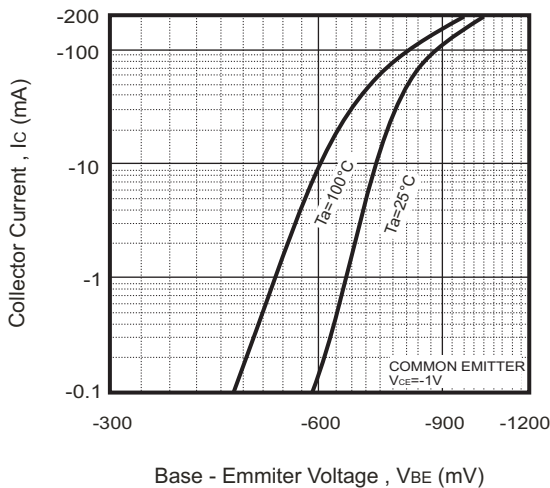
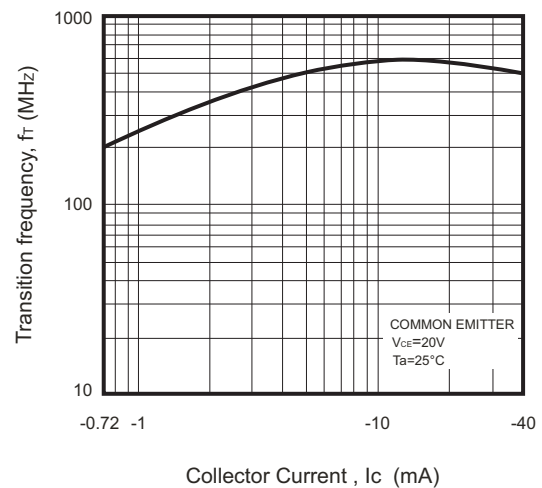


Fig.6 -  $f_T - I_c$



## Rating And Characteristic Curves (TK3906LED03-HF)

Fig.7 -  $C_{ob}/C_{ib} - V_{CB}/V_{EB}$

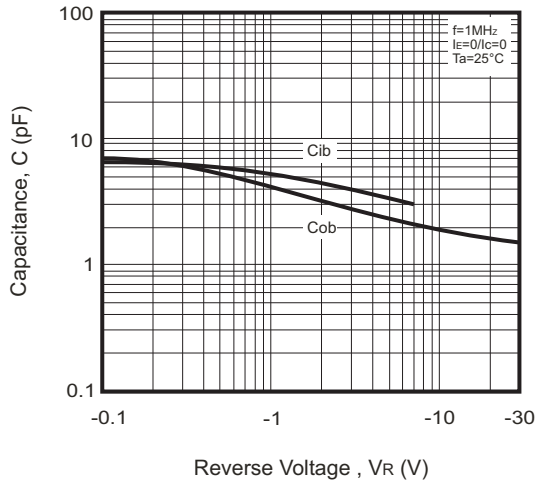
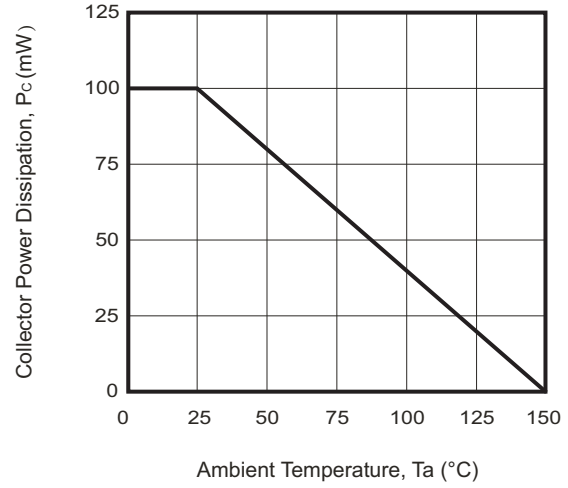
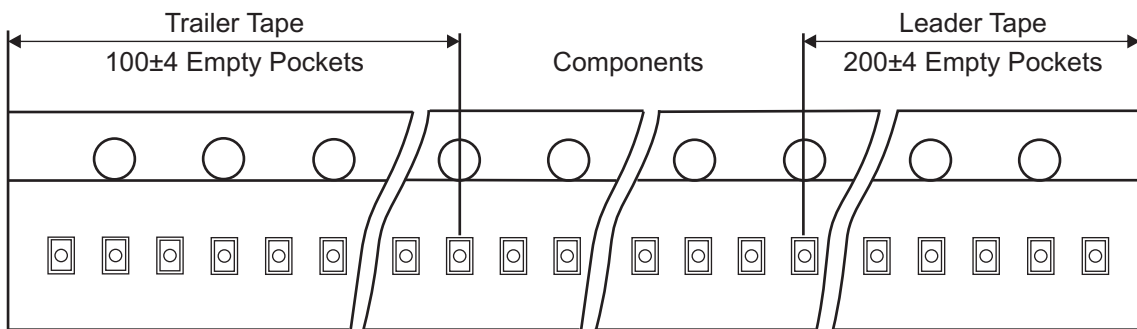
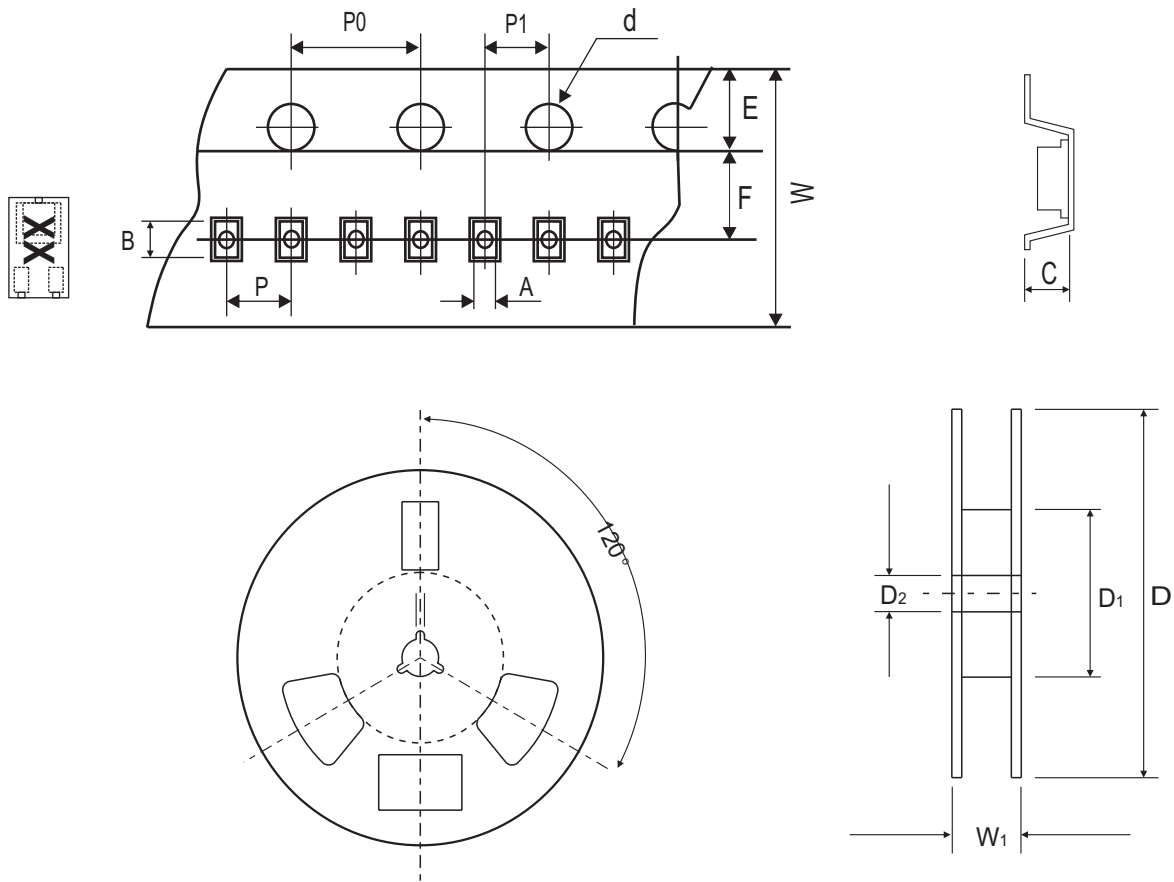


Fig.8 -  $P_c - T_a$



## Reel Taping Specification



WBFBP-03E (SOT-883)	SYMBOL	A	B	C	d	D	D <sub>1</sub>	D <sub>2</sub>
	(mm)	0.66 + 0.04 - 0.01	1.15 ± 0.05	0.66 ± 0.05	1.50 + 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.026 + 0.002 - 0.0004	0.045 ± 0.002	0.026 ± 0.002	0.059 + 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

WBFBP-03E (SOT-883)	SYMBOL	E	F	P	P <sub>0</sub>	P <sub>1</sub>	W	W <sub>1</sub>
	(mm)	1.75 ± 0.10	3.50 ± 0.05	2.00 ± 0.05	4.00 ± 0.05	2.00 ± 0.05	8.00 + 0.30 - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.079 ± 0.002	0.157 ± 0.002	0.079 ± 0.002	0.315 + 0.012 - 0.004	0.484 ± 0.039

Company reserves the right to improve product design, functions and reliability without notice.

REV:A

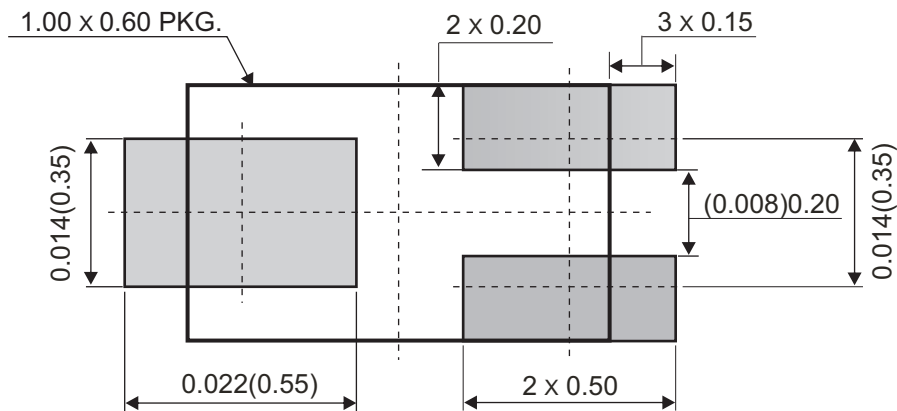
## Marking Code

Part Number	Marking Code
TK3906LED03-HF	3N



3N = Device code  
 Solid dot = Pin 1 indicator

## Suggested PAD Layout



## Standard Packaging

Case Type	REEL PACK	
	REEL ( pcs )	Reel Size (inch)
WBFBP-03E	10,000	7